

# Forensic Sciences

Program Advisor: Dr. Lee Goff

**Degrees Offered:** Bachelor of Science in Forensic Sciences

**Minor Offered:** Forensic Sciences

## Program Objective

To provide students with knowledge and skills for application of scientific principles and technological skills to further the purpose of justice in the study and resolution of criminal, civil and regulatory issues.

## Program Learning Outcomes

Upon completion of the undergraduate major in Forensic Sciences students will have:

1. demonstrated comprehension of basic sciences related to FS.
2. demonstrated an understanding of the legal system governing the admissibility of the evidence they will be collecting and analyzing.
3. demonstrated a proficiency in preparation of written and oral reports and testimony.
4. demonstrated a working knowledge of the different sub disciplines in the forensic sciences.
5. demonstrated an understanding of the techniques involved in recognition, documentation, and analysis of forensic evidence.

## Career Options

A Bachelor of Science degree in Forensic Sciences prepares the student for a career in a crime laboratory or crime scene investigation, and provides an excellent basis for further studies in Forensic Sciences at the graduate level. This degree also provides an excellent basis for students seeking to enter professional schools of medicine, dentistry and veterinary medicine.

## Advantages of the Chaminade Forensic Sciences Program

1. Integrates the functional (lab experience, field work, internships) with academic (solid sciences and criminal justice cores);
  2. Small classes (Avg. 15 in lecture/lab; avg. 10 or less in upper division);
  3. Committed to personal advising and mentoring;
  4. Hands-on experience with current molecular techniques;
  5. Encourages individual research and cooperates with other research and law enforcement institutions;
  6. Actively assists students' attendance at national and international meetings and conferences;
- Encourages and prepares students to pursue further graduate studies.

The forensic sciences major require the completion of the following courses:

*Pre-Major courses:* 56 credit hours; 13 courses to include the following:

BI 205 and BI 205L	Cellular and Organismal Biology I: Cellular Physiology (3-1)
BI 206 and BI 206L	Cellular and Organismal Biology II: Organs and Organisms (3-1)
CH 203 and CH 203L	General and Analytical Chemistry (4-1)
CH 204 and CH 204L	General and Analytical Chemistry (3-2)
CH 323 and CH 323L	Organic Chemistry (4-1)
CH 324 and CH 324L	Organic Chemistry (4-1)
CJ 151	Criminal Justice Systems (3)
CJ 223	Introduction to Law (3)
FS 190	Introduction to Forensic Sciences (1)
FS 330	Forensic Sciences (3)

MA 210	Calculus I (4)
MA 211	Calculus II (4)
PHY 251 and PHY 251L	University Physics I (4-1)
PHY 252 and PHY 252L	University Physics II (4-1)

*Major courses:* 34-37 credit hours, 10 courses 300 level and above courses to include the following:

BI 207 and BI 207LL	Molecular Biology I: Genes and Genetics (3-1)
CH 360 and CH 360L	Biochemistry (3-1)
CH 434 and CH 434L	Analytical Chemistry (3-1)
CJ 423	Criminal Law II (3)
FS 333	Physical Forensic Sciences (3)
FS 340 and FS 340L	Crime Scene Investigation (4)
FS 444 and FS 444L	Forensic Biology (3-1)
FS 487	Internship (3-6)
FS 490	Seminar- 2 semesters req. (2)
MA 331	Introduction to Probability and Statistics (3)

*Major electives:* 6-9 credits from courses listed below:

BI208 and BI208L	Molecular Biology II: Genomics and Epigenetics (3-1)
BI210L	Biotechniques I: DNA/RNA/protein (2)
BI211L	Biotechniques II: Advanced Instrumentation (2)
BI320 and BI320L	Developmental Biology I: Genetic Control and Patterning (3-1)
CH430L	Instrumental Analysis (2)
BC420	Physical Chemistry (3)
CH403	Inorganic Chemistry (3)
CJ 463	Sex Crimes (3)
CJ 465	Narcotics and Drug Use (3)
FS 335 and FS 335L	Forensic Entomology (4)
FS 350 and FS 350L	Forensic Photography (4)
FS 440	Detection and Rec. of Human Remains (2)
FS 450	Forensic Anthropology (3)

*Pre-Minor courses:* 18 credit hours; 8 courses to include the following:

BI 205 and BI 205L	Cellular and Organismal Biology I: Cellular Physiology (3-1)
BI 206 and BI 206L	Cellular and Organismal Biology II: Organs and Organisms (3-1)
CH 203 and CH 203L	General and Analytical Chemistry (4-1)
CH 204 and CH 204L	General and Analytical Chemistry (3-2)

*Minor in Forensic Science:* 11 credit hours, 300 level and above, courses to include all of the following:

CJ 330/FS 330	Forensic Sciences (3)
FS 333	Physical Forensic Sciences (3)
FS 444 and 444L	Forensic Biology (3-1)
FS 487	Internship (1)

Please see the sections in biology, chemistry, criminal justice, mathematics and physics for course descriptions.

## Course Descriptions

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### Forensic Sciences (FS)

#### FS 190 Introduction to Forensic Sciences Seminar (1)

A seminar series designed to present an overview of different areas of the Forensic Sciences. Areas to be covered include: Anthropology, Crime Scene Investigation, Criminalistics, Engineering, Ethics, Jurisprudence, Pathology, Toxicology, Questioned Documents, and related topics. Offered Spring and Fall Semester. Required of Forensic Sciences majors. No prerequisite

### English 102 and COM 101 are prerequisites for all upper division courses

#### FS 330 Forensic Sciences (3)

Scientific methods applied to the gathering and preservation of criminal evidence. Offered Spring and Fall Semester.

#### FS 333 Physical Forensic Sciences (3)

A scientific examination of various non-biological types of evidence. Examines the underlying theory and relevance of each type of evidence; applies the scientific techniques of examination for each type of evidence; and interpretation of each type of evidence. Offered annually. Prerequisites: BI 205/BI 205, BI 206/BI 206L, CJ 330 or concurrent registration.

#### FS 335 Forensic Entomology (3)

Introduction to scientific examination of medicocriminal entomological evidence. Taxonomy of insects and other arthropods of forensic significance; collection and preservation techniques; insect life cycles; and techniques for analyses data to include estimations of time since death, postmortem movement of body, wound assessment, entomotoxicology, DNA and applications to cases of abuse and neglect. Offered annually. Prerequisites: BI 205/BI 205L, BI 206/BI 206L. FS 330 or concurrent registration recommended.

#### FS 335L Forensic Entomology Lab (1)

2, 1.5 hour laboratory periods per week to accompany FS 335. Laboratory work includes practical identifications of insects and other arthropods of forensic significance; decomposition studies; collection and preservation of specimens; and field exercises. Offered annually. Concurrent registration in FS 335 is required. *Materials intensive fee applie.s*

#### FS 340 Crime Scene Investigation (3)

Introduction to techniques of crime scene investigation. Emphasis will be on search techniques, scene diagramming, photography, proper documentation, recovery and preservation of different categories of evidence. Aspects of chain of custody of materials collected and other problems related to admissibility of evidence will be discussed. Offered annually. FS 330 or consent of instructor. Concurrent registration in FS 340L is required.

#### FS 340L Crime Scene Investigation Laboratory (1)

Two, one and a half hour laboratory periods per week to accompany FS 340. Laboratory and field exercises to provide experience in crime scene search and processing, recognition, collection and preservation of different categories of evidence. Applications of photography to scene documentation. Use of proper personal safety precautions while at crime scene. Offered annually. Concurrent registration in FS 340 is required.

#### FS 350 Forensic Photography (3)

Introduction to photographic techniques use in the various forensic sciences. Emphasis will be placed on crime scene photography, beginning with general scene photos followed by detailed, often macro photography. Included will be fingerprint photography, fluorescence and luminescence photography of body fluids and latent fingerprints, and photography of laser beams in bullet trajectory cases. The use of filters will be stressed. Methods of "painting with light" will be discussed for large outdoor scenes. Students will also receive instruction in photo microscopy. Student must be familiar with the SLR format camera. Offered annually. Prerequisites: FS 330, FS 333 or permission of instructor.

**FS 350L Forensic Photography Laboratory (1)**

Two one and a half hour laboratory periods per week, to accompany FS-350. Laboratory exercises will be hands on assignments with the 35 mm SLR Camera. Students will get experience in general crime scene photography, macro and wide angle photography, fluorescence and luminescence photography, photo microscopy, and night operations which will have exercises in large area open night scenes and bullet trajectory photos. Students will also understand the use of many different filters used in forensics. Offered annually. Prerequisite: Concurrent registration in FS 350 is required. *Materials intensive fee applies.*

**FS 440 Detection and Recovery of Remains (2)**

Intensive one-week surveying techniques used to detect and recover decomposing human remains in an outdoor habitat. Emphasis will be on scattered surface remains and detection of clandestine graves. Techniques presented will include those from anthropology, archeology, entomology, geophysical, and remote sensing. Materials will be presented as a series of lectures and field exercises. Prerequisites: FS 330 and FS 333 or consent of instructor; preference given to presently enrolled Chaminade students.

**FS 444 Forensic Biology (3)**

A scientific examination of biological evidence. Includes examining the scientific basis of many types of biological evidence, applying scientific methods to and interpretation of biological evidence. Cross-listed as BI 444. Offered annually. Prerequisites: BI 205/L, BI 206/L, BI207/L, CJ/FS 330. CH 203/203L and CH 204/204L Concurrent registration in BI/FS 444L is required.

**FS 444L Forensic Biology Laboratory (1)**

One three-hour laboratory period per week to accompany FS 444. Laboratory work includes such topics as blood analysis and identification, use of chromatographic and electrophoretic techniques, and PCR as applicable to forensic identification. Concurrent registration in FS 444 required.

**FS 450 Forensic Anthropology (3)**

This course is an introduction to the techniques of anthropology, archaeology, osteology and anthropometry as applied to forensic problems. Techniques covered will include those involved in determination of the individual's age at death, sex, height and detection of antemortem/perimortem trauma. Offered annually. Prerequisites: BI 203, BI 204, FS 330 or concurrent registration recommended.

**FS 487 Internship (1-6)**

Field work experience in an approved criminal justice agency. A minimum of 45 clock hours of work experience per credit hour is required. In addition to the field work, the student will be required to write a paper, be evaluated by the agency, and complete an oral interview with a faculty member. Departmental approval is required prior to enrollment. A minimum of three and a maximum of six credit hours. Offered Spring and Fall. Prerequisites: FS 333, FS 444, and senior in forensic science.

**FS 490 Senior Seminar (1)**

Reading and discussion of most recent forensic techniques and applications. One oral presentation by each participant required. May be repeated for credit. Offered Spring and Fall. Prerequisites: senior standing in forensic science.